



Dart Aerospace Ltd.
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D412-664-203TRN
Job Sheet 202952



Part No: D412-664-203TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 11/5/19

Job Tracking No:

Due Date: 12/12/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: D412-664-243 REV F IPP Rev:A 08-03-06 new issue DD verified by:eec IPP Rev B 08.04.02 Removed polish
EC verified by: DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	DAS Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier			
100	Mori Seiki TL-40 - 1	1 pcs		12/12/19	1.00	2.25	Mori Seiki TL-40 - 1			66 2019/11/12 9-89
110	QC 2	1 pcs		12/12/19	0.00	0.00	QC 2 - 1			
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
QC 2 - 62										
QC 2 - 63										
QC 2 - 8										
QC 2 - 66										
QC 2 - 64										

Plex 11/5/19 2:33 PM Dart.lajeunesse.marie

				QC 2 - 65	
				QC 2 - 5	
				QC 2 - 71	
				QC 2 - 73	
				QC 2 - 69	
120	Mori Seiki TL-40 - 2 - B4B	1	12/12/19	1.00 3.00	Mori Seiki TL-40 - 1 - B4B
	pcs				
130	QC 2	1	12/12/19	0.00 0.00	QC 2 - 1
	pcs				
					QC 2 - 12
					QC 2 - 14
					QC 2 - 17
					QC 2 - 19
					QC 2 - 2
					QC 2 - 20
					QC 2 - 22
					QC 2 - 23
					QC 2 - 25
					QC 2 - 32
					QC 2 - 33
					QC 2 - 35
					QC 2 - 39
					QC 2 - 4
					QC 2 - 40
					QC 2 - 44
					QC 2 - 45
					QC 2 - 48
					QC 2 - 49
					QC 2 - 50
					QC 2 - 51
					QC 2 - 52
					QC 2 - 57
					QC 2 - 62
					QC 2 - 63
					QC 2 - 8
					QC 2 - 66
					QC 2 - 64
					QC 2 - 65
					QC 2 - 5
					QC 2 - 71
					QC 2 - 73
					QC 2 - 69
140	QC 8	1	12/12/19	0.00 0.00	QC 8 - 12
	pcs				
					QC 8 - 14
					QC 8 - 17
					QC 8 - 20
					QC 8 - 25
					QC 8 - 3
					QC 8 - 32
					QC 8 - 33
					QC 8 - 35
					QC 8 - 39
					QC 8 - 4
					QC 8 - 44
					QC 8 - 45
					QC 8 - 49
					QC 8 - 58
					QC 8 - 8
					QC 8 - 9
					QC 8 - 68

DAS
66 2019/11/13
9-89

DAS
66 2019/11/19
9-89

					QC 8 - 67	
					QC 8 - 1 (A)	
					QC 8 - 47	
					QC 8 - 40	
					QC 8 - 52	
					QC 8 - 23	
					QC 8 - 57	
					QC 8 - 76	
					QC 8 - 61	
145	Crosstubes - 2 - B4B	1 pcs	12/12/19	0.00 0.25	Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
150	Handfinish - 1-1 Chemical-B4B	1 pcs	12/12/19	0.00 1.00	Handfinish - 1 - 1 - B4B	
					Handfinish - 1 - 2 - B4B	
					Handfinish - 1 - 3 - B4B	
					Handfinish - 1 - 4 - B4B	
					Handfinish - 1 - 5 - B4B	
					Handfinish - 1 - 6 - B4B	
					Handfinish - 1 - 7 - B4B	
					Handfinish - 1 - 8 - B4B	
					Handfinish - 1 - 9 - B4B	
					Handfinish - 1 - 10 - B4B	
					Handfinish - 1 - 11 - B4B	
					Handfinish - 1 - 12 - B4B	
					Handfinish - 1 - 13 - B4B	
					Handfinish - 1 - 14 - B4B	
					Handfinish - 1 - 15 - B4B	
					Handfinish - 1 - 16 - B4B	
					Handfinish - 1 - 17 - B4B	
					Handfinish - 1 - 18 - B4B	
					Handfinish - 1 - 19 - B4B	
					Handfinish - 1 - 20 - B4B	
					Handfinish - 1 - 21 - B4B	
					Handfinish - 1 - 22 - B4B	
160	QC 7	1 pcs	12/12/19	0.00 0.00	QC 7 - 10	
					QC 7 - 13	
					QC 7 - 14	
					QC 7 - 15	
					QC 7 - 17	
					QC 7 - 18	
					QC 7 - 19	
					QC 7 - 2	
					QC 7 - 28	
					QC 7 - 3	
					QC 7 - 30	
					QC 7 - 34	
					QC 7 - 36	

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				QC 7 - 37	
				QC 7 - 41	
				QC 7 - 47	
				QC 7 - 48	
				QC 7 - 51	
				QC 7 - 58	
				QC 7 - 59	
				QC 7 - 60	
				QC 7 - 9	
				QC 7 - 68	
				QC 7 - 50	
				QC 7 - 67	
				QC 7 - 40	
				QC 7 - 24	
				QC 7 - 43	
				QC 7 - 61	
				QC 7 - 81	
				QC 7 - 76	
				QC 7 - 79	
					DAS 76 9-89
170	Packaging 3-1 - Stock - B4B	1 pcs	12/12/19	0.00 0.00	Packaging 3 - 1 - B4B
					Packaging 3 - 2 - B4B
					Packaging 3 - 3 - B4B
					Packaging 3 - 4 - B4B
					Packaging 3 - 5 - B4B
					Packaging 3 - 6 - B4B
					Packaging 3 - 7 - B4B
					Packaging 3 - 8 - B4B
					Packaging 3 - 9 - B4B
					Packaging 3 - 10 - B4B
					Packaging 3 - 11 - B4B
					Packaging 3 - 12 - B4B
					Packaging 3 - 13 - B4B
					Packaging 3 - 14 - B4B
					Packaging 3 - 15 - B4B
					Packaging 3 - 16 - B4B
					Packaging 3 - 17 - B4B
					Packaging 3 - 18 - B4B
					Packaging 3 - 19 - B4B
					Packaging 3 - 20 - B4B
					Packaging 3 - 21 - B4B
					Packaging 3 - 22 - B4B
					Packaging 3 - 23 - B4B
					Packaging 3 - 24 - B4B
					Packaging 3 - 25 - B4B
					Packaging 3 - 26 - B4B
					Packaging 3 - 27 - B4B
					Packaging 3 - 28 - B4B
					Packaging 3 - 29 - B4B
					Packaging 3 - 30 - B4B
					Packaging 3 - 31 - B4B
					Packaging 3 - 32 - B4B
					Packaging 3 - 33 - B4B
					Packaging 3 - 34 - B4B
					Packaging 3 - 35 - B4B
					Packaging 3 - 36 - B4B
					DAS 21 9-89
180	QC 21 - SA	1 pcs	12/12/19	0.00 0.00	QC 21 - SA - 21
					QC 21 - SA - 70
					QC 21 - SA - 53
					DEC 16 2019
Part Op 100 - 1-Fill tube with sand & Install plugs 412-203 on both ends as per Folio FA166 2-Face both sides of tube 3-Turn first					

Descriptions: taper section on both side as per Folio FA166 4- blend transition lines using belt sander with 60 grit sandpaper
110 - (QC2- Inspect parts off machine FAI/FAIB)
120 - Mori Seiki TL-40 (Mori Seiki CNC Lathe Large) 1-Turn second taper on both sides as per Folio FA166 2- Blend transition lines using belt sander with 60 grit sandpaper. 3- Remove sand and plugs 4-Scribe part # and batch # using vibrating stilus
130 - (QC2- Inspect parts off machine FAI/FAIB)
140 - (QC8- Inspect parts - second check)
145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.
150 - 1- handfinish X-TUBE INSIDE AND OUT
160 - (QC7-Inspect Chemical Conversion Coat)
170 - (Identify as per dwg & Stock Location: _____) LOCATION : LG014
180 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6009-129	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F139425

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6009-129	1	76	0

Part Specifications

Specifications could not be found.



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Container No: S231179**Part: D412-664-203TRN****Job No: 202952****Serial No/Batch: S231179****Revision: F****Inspector:****Exp Date:****Instructions:**

Date: 11/12/19

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DART AEROSPACE LTD	Work Order: 202952
Description: Crosstube Assembly (412 High Aft)	Part Number: D412-664-243
Inspection Dwg: D412-664-243 Rev: F	Page 1 of 2

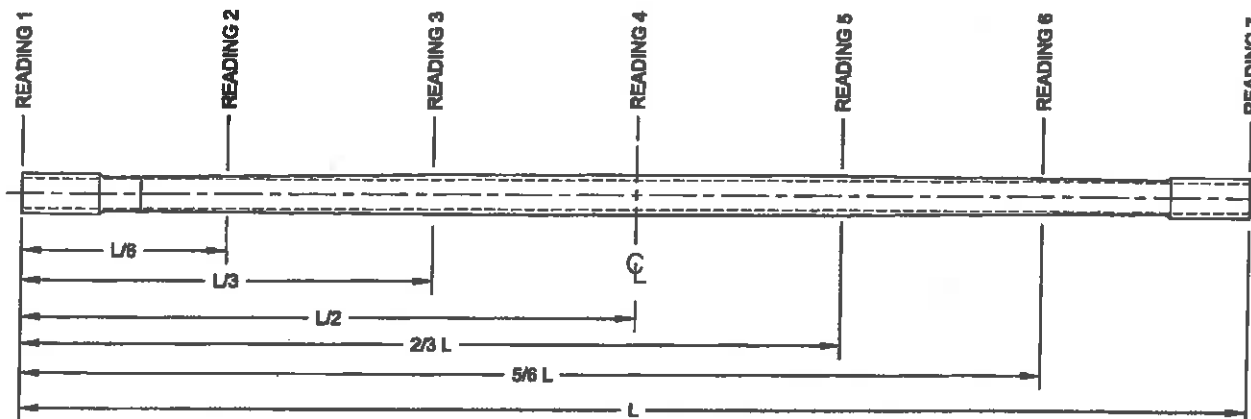
FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.688	✓		CNC-04	
	2.748	+0.005/-0.000	2.753	✓		↓	
	2.884	+0.005/-0.000	2.889	✓		↓	
	3.019	+0.005/-0.000	3.024	✓		CNC-05	
	3.163	+0.005/-0.000	3.168	✓		↓	
	3.308	+0.005/-0.000	3.313	✓		↓	
	3.429	+0.005/-0.000	3.434	✓		↓	
	2.990	+0.005/-0.000	2.995	✓		CNC-04	
	2.618	+0.005/-0.000	2.623	✓		"	
	0.200	+/-0.010	194	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		AG	
	R0.500	+/-0.010	.500	✓		"	
	4.971	+/-0.030	4.968	✓		CNC-08	
SIDE B	2.684	+0.005/-0.000	2.689	✓		CNC-04	
	2.748	+0.005/-0.000	2.753	✓		↓	
	2.884	+0.005/-0.000	2.889	✓		↓	
	3.019	+0.005/-0.000	3.024	✓		CNC-05	
	3.163	+0.005/-0.000	3.168	✓		↓	
	3.308	+0.005/-0.000	3.313	✓		↓	
	3.429	+0.005/-0.000	3.434	✓		↓	
	2.990	+0.005/-0.000	2.995	✓		CNC-04	
	2.618	+0.005/-0.000	2.623	✓		"	
	0.200	+/-0.010	198	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		AG	
	R0.500	+/-0.010	.500	✓		"	
	4.971	+/-0.030	4.970	✓		CNC-08	
	124.100	+/-0.020	124.09	✓		Tape	

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DART AEROSPACE LTD	Work Order: 208952
Description: Crosstube Assembly (412 High Aft)	Part Number: D412-664-243
Inspection Dwg: D412-664-243 Rev: F	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.362	.348	.366	.380	.032	0.073"
READING 2 L=20.683	.298	.297	.306	.309	.012	
READING 3 L=41.367	.457	.479	.493	.462	.036	
READING 4 L=62.050	.613	.625	.630	.622	.017	
READING 5 L=82.733	.482	.454	.462	.492	.038	
READING 6 L=103.417	.317	.295	.311	.312	.022	
READING 7 L=124.100	.358	.352	.365	.375	.023	

Calibration Result

Actual Block Thickness: 100-750

Sitiescan 250 Measured Thickness: 100-750

DAS
76

Measured by:	66
Date:	2019/11/19

Audited by:	9-89
Date:	2019/11/19

Preliminary Approval:	
Date:	

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	
D	10.02.02	Dimension 124.100 was 124.09	KJ	
E	12.08.04	Wall thickness form added	KJ	
F	14.06.24	Dwg Rev updated	KJ	

Item	Qty	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D8009-128	CROSSTUBE
3	2	D3096-063-570	RUBBER CUSHION
4	1	D2886-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	SCOTCH-WELD DP480	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 880 B-2	SEALANT

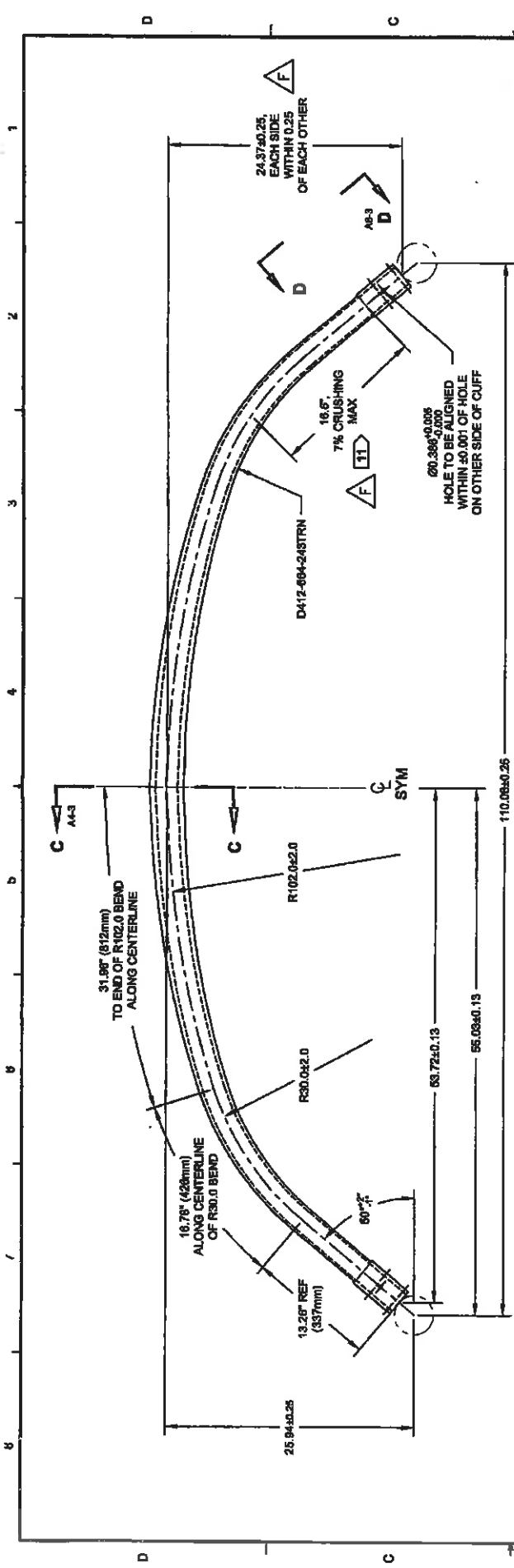
GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8009-128
FINISHED LENGTH = 124.10x0.020 (BEFORE BENDING)
- 2) FINISH:
CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C5-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PN 'D412-664-243' AND BIN ON INSIDE OF CUFF PER QSI 044 & 4 (VIBRATING STYLUS)
- 7) WEIGHT: 47.0 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. DO NOT GRIND TUBE AFTER SHOT PEEN.
- TURNING
10) WHEN TRANSITIONING TO STOCK MAT'L, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- BENDING
11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R30 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPT INSPECTION.
- ASSEMBLY
13) INSTALL D2886-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP480 PER QSI 016.
- 14) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3596-063-570 RUBBER CUSHIONS TO SECURE THE D2886-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) APPLY A THIN COAT OF PROSEAL 880 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEAL 880 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 880 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2886-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 TH-READS SHOWING IN SAFETY AND THAT NUT WAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

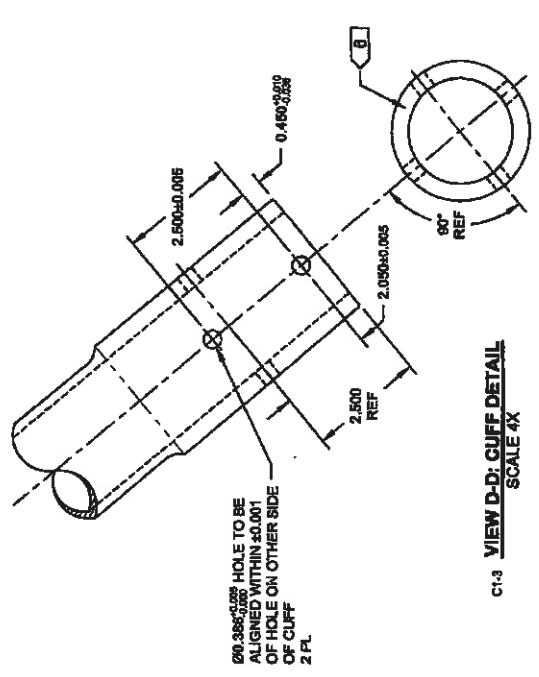
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WORK ORDER
NO. 20252105

RELEASED
2014-05-26

F	NOTES RE-ORDERED. SCOTCH-WELD WAS MAGNOBOND (C5-1). DO CLAMP INSTRUCTIONS (A5-1). REMOVE ABRASION STRIP AND INSPECTION WINDOW (C5-1). CHAFING SHIELD NOW 4.31 WIDE (C5-2). ADD 7% CRUSHING (B4-1). CHG BEND HEIGHT TO 0.425 (C1-3). CHG CUFF TOL (D2-1). CLAMPS FLIPPED TO PREVENT CHAFING (B7-2, B7-3). INCORP. DED E2/4.	CP	14.04.01
E	REFORMATRIVISE GENERAL NOTES: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. RELOCATED FLAG #6 PER R4 05-046 (ZN AP-3). ADD TOLERANCE (N B6-1, C4-3, C5-1). MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.08.30
D	REMOVE D2732-005. CHANGE TO D3596-063-570	PH	07.03.09
C	REMOVE D3859-003-1087. ADD D2732-005 & MAGNOBOND 6398. MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATIBILITY WITH BHTAA	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED	DW		
MFGL APPR			
APPROVED			
DE APPR			
DATE	14.04.01		
DART AEROSPACE LTD HAMPSHIRE, ONTARIO, CANADA			
REV. F DRAWING NO. D412-664-243 SHEET 1 OF 4			
TITLE CROSSTUBE ASSEMBLY (412 HI AFT) SCALE NTS			
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D412-864-803
BENDING AND DRILLING DETAIL



RELEASED
R 2014-05-26

DESIGN	00	DART AEROSPACE LTD	REV. F
DRAWN	00	HARRISBURG, ONTARIO, CANADA	
CHECKED	00	DRAWING NO.	SHEET 3 OF 4
MFG. APPR.	00	D412-864-243	SCALE
DE APPR.	00	TITLE	CROSSTUBE ASSEMBLY (412 HI AFT) NTS
DATE	14.04.01		

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Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only

NCR No. _____

Job: _____

Part No. _____

DISPOSITION

Rework ☐ ☐ ☐
Scrap ☐ ☐ ☐
Use-as-is ☐ ☐ ☐

DEPARTMENT/PROCESS

Cross tube ☐ ☐ ☐
Small Fab ☐ ☐ ☐
Finishing ☐ ☐ ☐
Skid-tube ☐ ☐ ☐
Machining ☐ ☐ ☐
Large Fab ☐ ☐ ☐

Eng. (Non-AW) ☐ ☐ ☐
Prod. Eng. Coord. ☐ ☐ ☐
Rec/Store/Packaging ☐ ☐ ☐
Engineering ☐ ☐ ☐
Water Jet ☐ ☐ ☐
Supplier ☐ ☐ ☐
Quality ☐ ☐ ☐

Date: _____ Sequence #: _____

QTY Affected: _____

MRB (QS1042)

Description Work Order Deviation

Disposition

Completed By

Lead hand / Supervisor

QC / QA Coordinator

Root Cause

Operator ☐ ☐ ☐
Manufacturing Process ☐ ☐ ☐
Equip/Tooling ☐ ☐ ☐
Handling/Preservation ☐ ☐ ☐
Material ☐ ☐ ☐
Product Improvement ☐ ☐ ☐
Process Improvement ☐ ☐ ☐
Human Factors ☐ ☐ ☐

FAULT CATEGORY

Pressure/Forced ☐ ☐ ☐
Bending ☐ ☐ ☐
Crushing ☐ ☐ ☐
Cracks ☐ ☐ ☐
Crimp/kink/Ripple/Wave/Twist ☐ ☐ ☐
Marks/Chatter ☐ ☐ ☐
Mislabeled ☐ ☐ ☐
Contamination ☐ ☐ ☐
Misaligned/off center ☐ ☐ ☐
BOM/Route ☐ ☐ ☐
Broken/Damage/Defect ☐ ☐ ☐
Incomplete/Unclear Instructions ☐ ☐ ☐
Drill Holes ☐ ☐ ☐
Fit/Function ☐ ☐ ☐

Power Loss/Surge ☐ ☐ ☐
Folio/Program ☐ ☐ ☐
Grain Direction ☐ ☐ ☐
Weld ☐ ☐ ☐
Wrong Stock Pulled ☐ ☐ ☐
Out of Sequence ☐ ☐ ☐
Off-set/Set-up ☐ ☐ ☐
Positioned Wrong ☐ ☐ ☐
Outside Tolerance ☐ ☐ ☐
Drawing ☐ ☐ ☐
Finish ☐ ☐ ☐
Part Lost/Missing ☐ ☐ ☐
Misread ☐ ☐ ☐

Other/Details: